

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
21 August 2003 (21.08.2003)

PCT

(10) International Publication Number  
WO 03/068613 A1

(51) International Patent Classification<sup>7</sup>: B65D 3/22, 81/38, A47G 19/22

(21) International Application Number: PCT/FI03/00098

(22) International Filing Date: 7 February 2003 (07.02.2003)

(25) Filing Language: Finnish

(26) Publication Language: English

(30) Priority Data:  
20020286 13 February 2002 (13.02.2002) FI

(71) Applicant (for all designated States except US): STORA  
ENSO OYJ [FI/FI]; Kanavaranta 1, FIN-00160 Helsinki  
(FI).

(72) Inventors; and

(75) Inventors/Applicants (for US only): RÄSÄNEN, Jari  
[FI/FI]; Västäräkinkuja 15, FIN-55420 Imatra (FI).  
KARINE, Seppo [FI/FI]; Rajamiehenraitti 3, FIN-55910  
Imatra (FI).

(74) Agent: BERGGREN OY AB; P.O. Box 16, FIN-00101  
Helsinki (FI).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,  
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,  
SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 03/068613 A1

(54) Title: A METHOD FOR THE PREPARATION OF A DRINKING CUP OF BOARD



(57) Abstract: The invention relates to a method for manufacturing a disposable board drinking cup (10) and to the cup produced by the method. The cup is manufactured by folding a board blank between the cup mantle (5) and the collar (6), by bending and seaming the folded blank into a cone, the folding point forming the cup mouth (8), and by providing the thus seamed blank with a bottom. The cup thus formed comprises both a mantle (5) and a collar (6) bent downwardly from the cup mouth (8) and acting as a grip surface, making it easier to enjoy especially a hot drink from the cup. The shape of the cup mantle (5) and the collar (6) may be conically expanding, allowing the cups to be nested. The lower edge of the collar (6) can be equipped with a projection (12) for maintaining an air slot between the collar and the cup mantle.

**A method for the preparation of a drinking cup of board**

The invention relates to a method for manufacturing a board drinking cup, forming the cup mantle by folding and seaming sheet-like cup blanks. The invention also relates to the board drinking cup made by the method. The invention relates specifically to disposable cups produced in mass production, which are equally suitable for holding cool drinks and hot drinks.

10      Disposable cups are generally made of cup paperboard, which is coated with a polymer coating at least on the side forming eventually the inner surface of the cup, in order to provide a waterproof cup. Cups may be or not equipped with a lug, and they have typically a conically expanding shape, allowing the cups to be nested with a view to packaging or to loading into automatic dispensers for dispensing one at a time.

15      Current disposable cups without lugs are poorly suited for hot drinks, because the cup burns the user's fingers due to the poor thermal insulation capacity of the thin cup board. Cups with lugs do not involve this problem, however, because of the limited bearing capacity of the lug, it is usable only in relatively small cups. A cup with a lug also entails more intricate manufacture, and the foldable lug results in reduced comfort of use. Additionally, a disposable cup held by the lug may have poor stability when filled to the rim.

20      25      For the reasons above, there is a need for a solution for manufacturing a lug free paperboard drinking cup by simple means and in a modified shape allowing also hot drinks to be easily enjoyed. The method of the invention, which provides the desired solution, is characterised by folding the cup blank at least partly double, so as to form in the cup both a mantle and an external collar directed downwardly from the cup mouth, with the folding point forming the cup mouth.

30      35      The collar provided by folding the blank forms a double wall construction in the area of the grip surface on the cup, this double wall construction basically providing double thermal insulation capacity of the wall construction. This already makes a cup containing a hot drink notably easier to hold. Additionally, the collar, which except for its folding point at the cup mouth, is detached from the cup mantle,

leaves an inner air layer acting as supplementary thermal insulation between the collar and the mantle.

The folded collar is preferably formed as a ring encircling the cup and covering the

5 portion of the outer surface of the cup determined by the ratio of the collar height to the cup mantle height. The annular collar is simple in design, and also enhances the solidity of the cup structure markedly. This, in turn, allows a thinner cup board thus achieving material savings.

10 The material of the drink cup of the invention is appropriately a polymer-coated board, which is produced as a continuous web by a board machine and can be cut into blanks, from which cups can be manufactured by folding and seaming. The collar of the invention is formed in the cup as the blank is folded.

15 The cup mantle is preferably conically expanding in the way disposable cups usually are, enabling the cups to be nested to save space. The collar folded in the upwardly conically expanding cup becomes similarly conically downwardly expanding. Then an air space expanding downwardly from the cup mouth is formed between the collar and the cup mantle, this air space providing efficient insulation

20 between the user's fingers and the mantle heated by the drink. A downwardly expanding collar also hampers piling of cups minimally.

In accordance with the invention, the lower edge of the collar can be equipped with an annular projection oriented inwardly towards the cup mantle. The projection may

25 consist of an enlargement of the cup material, having a stabilising effect on the cup as the user presses the collar against the cup mantle with his fingers. Additionally, the projection ensures a permanent air space acting as thermal insulation between the collar and the mantle. However, dimensioning of the projection should allow for a sufficient distance between the projection and the cup mantle in the normal cup

30 state, for the projection not to interfere with piling of cups.

The enlargement acting as reinforcement at the lower edge of the collar may also project from the grip surface of the collar, enabling the user to get a better hold of the collar with his fingers. Regardless of its orientation, the enlargement may

35 consist of a wind or an overlay in the cup material.

It is also possible to form an annular enlargement acting as reinforcement at the folding point in the cup mouth. Such an enlargement of the cup mouth, which is known *per se* in previous collar-free cups, may also serve to generate the desired true oral sensation for the user drinking from the cup.

5

A suitable cup collar height may vary e.g. in the range 1 to 5 cm, depending basically on the cup size. In proportion to the cup height, the collar height may account for 20 to 80%, preferably about 25 to 50% of this height. However, in the extreme case, the collar height may be even equal to the cup height, and then the 10 cup has a double wall throughout.

The board drinking cup of the invention, which can be manufactured as described above, is characterised by the cup mantle being folded from the cup mouth downwardly to form a collar providing a grip surface outside the mantle. The cup 15 mantle may be conically expanding, allowing the cups to be piled with their mantle and collar portions partly nested.

The invention is explained in further detail below by means of examples and with reference to the accompanying drawing, in which

20

Figures 1 to 3 show the folding and bending to form a cup out from a board cup blank step by step, with figure 1 showing the unfolded blank, figure 2 the blank, where the collar is folded, and figure 3 the blank after it has been seamed to the conically expanding shape of the cup,

25

Figure 4 shows a drinking cup, in which the lower edge of the collar is equipped with an inner enlargement projecting towards the cup mantle;

30

Figure 5 shows cups of figure 4 in nested state,

Figure 6

shows a drinking cup, in which the lower edge of the collar is equipped with a fold oriented inwardly towards the cup mantle,

35

Figure 7 shows a drinking cup in which the lower edge of the cup is equipped with an outwardly oriented enlargement, and

Figure 8 shows a drinking cup having enlargements both at the lower edge of the collar and at the mantle folding point in the cup mouth, and

Figure 9 shows a drinking cup, in which the collar has a height equal to that of the cup.

The manner of manufacturing the cup illustrated in figures 1 to 3 is particularly suitable for drinking cups made of board. Manufacture starts from a sheet-like blank 1 cut out from a polymer-coated cup paperboard shown in figure 1, the basic shape of the blank being part of a circular sector. The vertical sides 2 of the blank 1 are aligned with the circular radii and the horizontal sides 3 with the curvature of a co-centric circle. In figure 1, a broken line indicates a fold line 4 shaped as the curve of another co-centric circle, the blank 1 being divided into a mantle forming the sidewall of the cup and into an external annular collar by folding along the line 4.

Figure 2 shows the blank 1 after it has been divided into a part 5 forming the cup mantle and into a part 6 forming the collar by folding along the folding line 4. Folding is followed by bending to form the conically expanding cup shape of figure 3 and by heat sealing along the seaming line 7 formed by the overlapping vertical edges 2 of the blank. Thus the cup has been provided with a conically upwardly expanding mantle portion 5 and an annular collar 6 expanding similarly conically from the cup mouth 8 downwardly and encircling the mantle.

The cup blank folded and seamed as in figure 3 is equipped with a bottom attached by heat sealing. In the last step of the manufacturing process, the lower edge of the collar and/or the cup mouth may be equipped with an annular enlargement, such as a wind or an overlay. All of the cup working steps mentioned above can be implemented as serial production on a cup machine.

Figure 4 is a simplified cross-sectional drawing of a board drinking cup 10, which can be produced as in figures 1 to 3. The cup 10 comprises an upwardly expanding mantle 5 shaped as truncated cone, which constitutes the side wall of the cup, a bottom 11 attached by heat sealing and a collar 6 expanding downwardly conically

from the cup mouth 8 and having a height equal to about  $\frac{1}{4}$  of the cup height. At the lower edge of the collar 6, a wind 12 has been formed as reinforcement, projecting from the collar inwardly towards the cup mantle surface 5. Such a projection 12 prevents the collar 6 from being pressed against the cup mantle 5 by the user's fingers, thus maintaining a heat-insulating air slot between the collar and the mantle, preventing a hot drink from burning the user's fingers.

Owing to their conically expanding shape, the drinking cups 10 of figure 3 can be piled as in figure 5. Both the mantle portions 5 and the collars 6 of the cups are 10 partly nested in piling. Given the fully symmetrical cups 10, the pile will always be straight.

Figure 6 shows an application of the drinking cup 10 of the invention, in which the lower edge of the collar 6 is equipped with a fold 13 encircling the collar annularly 15 and oriented towards the cup mantle 5. The fold 13 has the same functions as the inner wind 12 within the cup collar 6 in figure 4. The fold 13 can be produced in the cup blank 1 in the first folding step, *i.e.* in connection with the folding of the collar 6 of figure 2.

20 Figure 7 shows a modification of the drinking cup 10 of figure 4, in which the wind 12 at the lower edge of the collar 6 projects outwardly from the collar grip surface. The wind 12 has a stiffening action on the collar 6 and makes it easier for the user to get a firm hold of the cup. A combination of the applications of figures 4, 6 and 25 7 is conceivable by providing the lower edge of the collar 6 projecting into both directions, *i.e.* both inwardly towards the cup mantle and outwardly from the collar.

In figure 8, the drinking cup 10 of figure 4 has been further modified by adding an annular wind 14 encircling the mouth at the cup mouth 8 as well. Such an enlargement of the cup mouth 8 acts as additional reinforcement in the cup, while 30 enhancing the comfort of use of the cup.

Figure 9 shows an application of the drinking cup 10 of the invention, in which the collar 6 has been extended to cover the cup mantle 5 in its totality. Such a collar 6 extending to the level of the cup bottom 11 enhances the stability of the cup placed 35 on a base, and allows the cup mantle portion, *i.e.* the cup proper, to be narrower or more markedly tapered in shape than normally. This solution may also be suitable for very shallow cups for structural and/or aesthetic reasons.

It is obvious to those skilled in the art that the applications of the invention are not restricted to the examples above, but may vary within the scope of the accompanying claims.

**Claims**

1. A method for manufacturing a board drinking cup (10), in which the cup mantle (5) is formed by folding and seaming a sheet-like cup blank (1), **characterised in** 5 that the cup blank (1) is folded at least partly double so as to form both a mantle (5) in the cup (10) and an external collar (6) oriented downwardly from the cup mouth (8), the folding point (4) forming the cup mouth.
2. A method as defined in claim 1, **characterised in** that the blank (1) is folded 10 before being bent and seamed as a cup (10).
3. A method as defined in claim 1 or 2, **characterised in** that the collar (6) is formed as a ring encircling the cup (10) and covering at least part of its outer 15 surface (5).
4. A method as defined in any of the preceding claims, **characterised in** that the mantle (5) of the cup (10) is conically expanding in shape.
5. A method as defined in any of the preceding claims, **characterised in** that an 20 annular projection (12, 13) oriented inwardly towards the cup mantle (5) is formed at the lower edge of the collar (6).
6. A method as defined in any of the preceding claims, **characterised in** that an annular enlargement (12) acting as reinforcement is formed at the lower edge of the 25 collar (6).
7. A method as defined in claims 5 and 6, **characterised in** that the enlargement (12) forms a projection oriented inwardly towards the cup mantle (5).
8. A method as defined in claim 6, **characterised in** that the enlargement (12) forms 30 a projection oriented outwardly from the collar (6).
9. A method as defined in any of claims 6 to 8, **characterised in** that the enlargement is a wind (12) or an overlay in the cup material.

10. A method as defined in any of the preceding claims, **characterised** in that an annular enlargement (14) acting as reinforcement is formed at the mantle folding point in the cup mouth (8).
- 5 11. A method as defined in any of the preceding claims, **characterised** in that the collar (6) has a height of 1 to 5 cm.
12. A method as defined in any of the preceding claims, **characterised** in that the collar (6) height accounts for 20 to 100%, preferably 25 to 50% of the cup (10) height.
- 10 13. A board drinking cup (10), which can be manufactured with the method defined in any of the preceding claims, **characterised** in that the cup mantle (5) is folded from the cup mouth (8) inwardly to form a collar (6) providing a grip surface outside the mantle.
- 15 14. A cup as defined in claim 13, **characterised** in that the cup mantle (5) is conically expanding in shape and that the cups (10) can be piled with their mantle and collar portions (5, 6) partly nested.

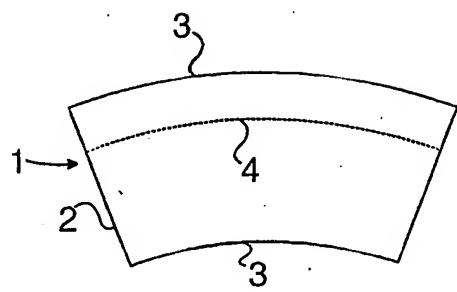


Fig. 1

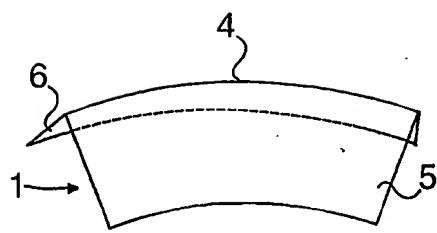


Fig. 2



Fig. 3

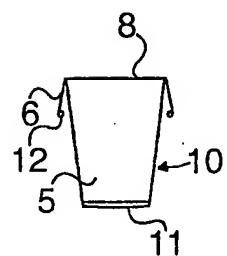


Fig. 4

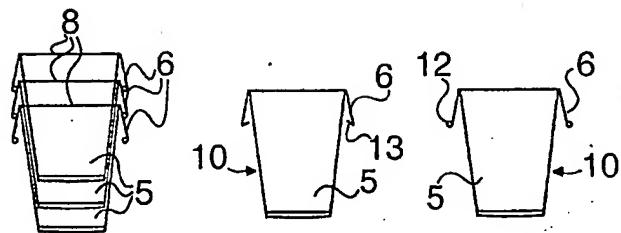


Fig. 5

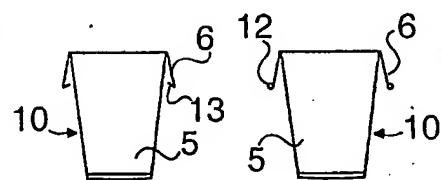


Fig. 6

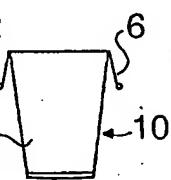


Fig. 7

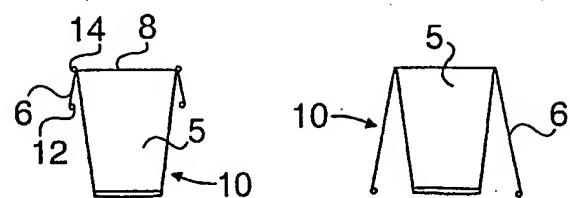


Fig. 8

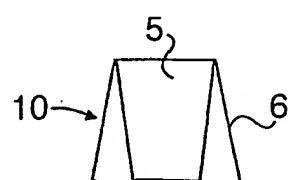


Fig. 9

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 03/00098

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65D 3/22, B65D 81/38, A47G 19/22  
 According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65D, A47G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2097893 A (S. REICH), 2 November 1937 (02.11.37), page 1, column 1, line 1 - line 3; page 1, column 1, line 38 - line 41; page 1, column 2, line 15 - line 34	1-14
X	US 5007578 A (R.A. SIMONE), 16 April 1991 (16.04.91), column 2, line 59 - column 3, line 5, claim 7	1-14
X	US 3827620 A (R.E. LUDDER), 6 August 1974 (06.08.74), column 3, line 16 - line 33	1-14

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents

- "A" document describing the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

10 April 2003

11 5 -05- 2003

Name and mailing address of the ISA/  
 Swedish Patent Office  
 Box 5055, S-102 42 STOCKHOLM  
 Facsimile No. +46 8 666 02 86

Authorized officer

Tommy Blomberg / MRO  
 Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 03/00098

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 05 14 September 2000 (2000-09-14) & JP 2000 062752 A (RENGO CO LTD), 29 February 2000 (2000-02-29) abstract	13-14
Y	--	1-12
X	EP 0005605 A1 (GENERAL FOODS LIMITED), 28 November 1979 (28.11.79), column 5, line 13 - line 29	13-14
Y	--	1-12
X	US 4867313 A (P. PADOVANI), 19 Sept 1989 (19.09.89), column 3, line 66 - line 68, abstract	13-14
Y	--	1-12
X	GB 2061699 A (MONOCONTAINERS LIMITED), 20 May 1981 (20.05.81), page 1, line 27 - line 34; page 1, line 94 - line 97; page 2, line 4 - line 53, abstract	13-14
Y	--	1-12
Y	US 4409053 A (G.H. NAUGLE ET AL), 11 October 1983 (11.10.83), column 1, line 11 - line 15; column 4, line 24 - line 59	1-12
Y	--	1-12
Y	US 6286754 B1 (D.E. STIER ET AL), 11 Sept 2001 (11.09.01), column 2, line 25 - line 54; column 3, line 3 - line 10	1-12
	-----	

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

29/03/03

International application No.  
PCT/FI 03/00098

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US	2097893	A	02/11/37	NONE	
US	5007578	A	16/04/91	AU 8308691 A CA 2042965 A WO 9202421 A	02/03/92 07/02/92 20/02/92
US	3827620	A	06/08/74	NONE	
EP	0005605	A1	28/11/79	SE 0005605 T3 AU 528933 B AU 4697379 A CA 1161404 A DE 2963222 D DK 148173 B,C DK 199179 A ES 250507 U,Y FI 71476 B,C FI 791535 A GB 1602258 A JP 1748088 C JP 3047843 B JP 54150277 A NO 151277 B,C NO 791615 A	19/05/83 22/11/79 31/01/84 00/00/00 22/04/85 17/11/79 16/07/80 10/10/86 17/11/79 11/11/81 25/03/93 22/07/91 26/11/79 03/12/84 19/11/79
US	4867313	A	19/09/89	BE 1000161 A CH 673384 A DE 3806039 A ES 1005325 U FR 2611469 A GB 2201581 A,B GB 8802812 D IT 8784909 D JP 63277016 A NL 8800522 A PT 86737 A SE 8800729 A IT 8784990 D	28/06/88 15/03/90 15/09/88 01/11/88 09/09/88 07/09/88 00/00/00 00/00/00 15/11/88 03/10/88 30/03/89 04/09/88 00/00/00
GB	2061699	A	20/05/81	NONE	
US	4409053	A	11/10/83	US 4382767 A	10/05/83
US	6286754	B1	11/09/01	NONE	